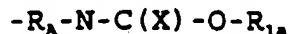


WHAT IS CLAIMED IS:

1. A compound comprising a plurality of linked nucleosides, wherein:

5 each nucleoside includes a ribofuranosyl sugar portion and a base portion; and

at least one of said nucleosides bears at a 2'-O-position or a 3'-O-position a substituent having formula:



10

or



where:

R_A is alkyl having from 1 to about 10 carbon atoms or $(CH_2-CH_2-Q)_x$;

15

R_{1a} is alkenyl having 2 to about 10 carbon atoms;

R_{1b} and R_{1c} , independently, are H, R_2 , R_A , an amine protecting group or have formula $R_A-N(R_{1d})(R_{1e})$, $C(X)-R_2$, $C(X)-R_A-R_2$, $C(X)-Q-R_A-R_2$, or $C(X)-Q-R_2$;

20

R_{1d} and R_{1e} , independently, are H, R_2 , R_A , an amine protecting group or have formula $C(X)-R_2$, $C(X)-R_A-R_2$, $C(X)-Q-R_A-R_2$, or $C(X)-Q-R_2$;

25

R_2 is a steroid molecule, a reporter molecule, a lipophilic molecule, a reporter enzyme, a peptide, a protein, includes folic acid, or has formula $-Q-(CH_2CH_2-Q)_x-R_3$;

X is O or S;

each Q is, independently, is NH, O, or S;

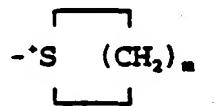
x is 1 to about 200;

30

R_3 is H, R_A , $C(O)OH$, $C(O)OR_A$, $C(O)R_4$, R_A-N_3 , or R_A-

NH_2 ;

R_4 is Cl, Br, I, SO_2R_5 or has structure:



35

m is 2 to 7; and

R_5 alkyl having 1 to about 10 carbon atoms.

2. The compound of claim 1 wherein more than one of said nucleosides bears said substituent at a 2'-O-position or a 3'-O-position.

3. The compound of claim 1 wherein R_A is alkyl having 5 1 to about 10 carbon atoms.

4. The compound of claim 1 wherein R_A is alkyl having 6 carbon atoms.

5. The compound of claim 1 wherein R_{1a} is alkenyl having 2 to about 10 carbon atoms.

10

6. The compound of claim 1 wherein R_{1a} is 2-propenyl.

7. The compound of claim 1 wherein R_{1b} is H and R_{1c} is H.

15 R₂.

8. The compound of claim 1 wherein R_{1b} is H and R_{1c} is

9. The compound of claim 1 wherein R_{1b} is H and R_{1c} is alkyl having 1 to about 10 carbon atoms.

10. The compound of claim 1 wherein R_{1b} is H and R_{1c} is alkyl 1 or 2 carbon atoms.

20

11. The compound of claim 1 wherein R_{1b} and R_{1c} , together, are phthalimido.

12. The compound of claim 1 wherein R_{1b} is H and R_{1c} is $R_A-N(R_{1d})(R_{1e})$.

25 R₂.

13. The compound of claim 12 wherein R_{1d} is H and R_{1e}

14. The compound of claim 12 wherein R_{1d} is H and R_{1e} is alkyl having 1 to about 10 carbon atoms.

15. The compound of claim 12 wherein R_{1c} is H and R_{1e} is alkyl 1 or 2 carbon atoms.

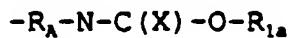
5 16. The compound of claim 12 wherein R_{1d} and R_{1e} , together, are phthalimido.

17. The compound of claim 12 wherein R_{1d} is H and R_{1e} is
R₂ or C(X)-Q-R₂.

10 18. The compound of claim 17 wherein R_{1e} is C(O)-O-R₂.

19. The compound of claim 17 wherein R_2 includes cholesterol or folic acid.

20. A nucleoside comprising a ribofuranosyl sugar portion and a base portion, wherein said nucleoside bears at 15 a 2'-O-position or a 3'-O-position a substituent having formula:



or



20 where:

R_A is alkyl having from 1 to about 10 carbon atoms or $(CH_2-CH_2-Q)_x$;

R_{1a} is alkenyl having 2 to about 10 carbon atoms;

25 R_{1b} and R_{1c} , independently, are H, R₂, R_A, an amine protecting group or have formula $R_A-N(R_{1d})(R_{1e})$, C(X)-R₂, C(X)-R_A-R₂, C(X)-Q-R_A-R₂, or C(X)-Q-R₂;

R_{1d} and R_{1e} , independently, are H, R₂, R_A, an amine protecting group or have formula C(X)-R₂, C(X)-R_A-R₂, C(X)-Q-R_A-R₂, or C(X)-Q-R₂;

R_2 is a steroid molecule, a reporter molecule, a lipophilic molecule, a reporter enzyme, a peptide, a protein, includes folic acid, or has formula -Q-(CH_2CH_2 -

5 Q)_x- R_3 ;

X is O or S;

each Q is, independently, is NH, O, or S;

x is 1 to about 200;

10 R_3 is H, R_A , $C(O)\text{OH}$, $C(O)\text{OR}_A$, $C(O)\text{R}_4$, $R_A\text{-N}_3$, or $R_A\text{-NH}_2$;

R_4 is Cl, Br, I, SO_2R_5 , or has structure:



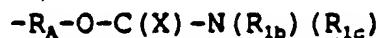
15 m is 2 to 7; and

R_5 alkyl having 1 to about 10 carbon atoms.

21. A compound comprising a plurality of linked nucleosides, wherein:

each nucleoside includes a ribofuranosyl sugar portion 20 and a base portion; and

at least one of said nucleosides includes a pyrimidine base which bears at its 5-position a substituent having formula:



25 where:

R_A is alkyl having from 1 to about 10 carbon atoms or ($\text{CH}_2\text{-CH}_2\text{-Q}$)_x;

30 R_{1b} and R_{1c} , independently, are H, R_2 , R_A , an amine protecting group or have formula $R_A\text{-N(R}_{1d}\text{)(R}_{1e}\text{)}$, $C(X)\text{-R}_2$, $C(X)\text{-R}_A\text{-R}_2$, $C(X)\text{-Q-R}_A\text{-R}_2$, or $C(X)\text{-Q-R}_2$;

R_{1d} and R_{1e} , independently, are H, R_2 , R_A , an amine protecting group or have formula $C(X)\text{-R}_2$, $C(X)\text{-R}_A\text{-R}_2$, $C(X)\text{-Q-R}_A\text{-R}_2$, or $C(X)\text{-Q-R}_2$;

35 R_2 is a steroid molecule, a reporter molecule, a lipophilic molecule, a reporter enzyme, a peptide, a

protein, includes folic acid, or has formula -Q-

$(\text{CH}_2\text{CH}_2\text{-})$

$Q\text{-})_x\text{-R}_3;$

X is O or S;

5 each Q is, independently, is NH, O, or S;

x is 1 to about 200;

R₃ is H, R_A, C(O)OH, C(O)OR_A, C(O)R₄, R_A-N₃, or R_A-NH₂;

10 R₄ is Cl, Br, I, SO₂R₅, or has structure:

$-\text{S} \left[\text{---} \right] (\text{CH}_2)_m;$

m is 2 to 7; and

R₅ alkyl having 1 to about 10 carbon atoms.

15 22. A nucleoside comprising a ribofuranosyl sugar portion and a pyrimidine base portion, wherein said base portion bears at its 5-position a substituent having formula:

$-\text{R}_A\text{-O-C(X)-N(R}_{1b}\text{)(R}_{1c}\text{)}$

where:

20 R_A is alkyl having from 1 to about 10 carbon atoms or $(\text{CH}_2\text{-CH}_2\text{-Q})_x$;

R_{1b} and R_{1c}, independently, are H, R₂, R_A, an amine protecting group or have formula R_A-N(R_{1d})(R_{1e}), C(X)-R₂, C(X)-R_A-R₂, C(X)-Q-R_A-R₂, or C(X)-Q-R₂;

25 R_{1d} and R_{1e}, independently, are H, R₂, R_A, an amine protecting group or have formula C(X)-R₂, C(X)-R_A-R₂, C(X)-Q-R_A-R₂, or C(X)-Q-R₂;

30 R₂ is a steroid molecule, a reporter molecule, a lipophilic molecule, a reporter enzyme, a peptide, a protein, includes folic acid, or has formula -Q- $(\text{CH}_2\text{CH}_2\text{-})$

$Q\text{-})_x\text{-R}_3;$

X is O or S;

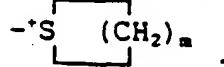
each Q is, independently, is NH, O, or S;

35 x is 1 to about 200;

R₃ is H, R_A, C(O)OH, C(O)OR_A, C(O)R₄, R_A-N₃, or R_A-NH₂;

R₄ is Cl, Br, I, SO₂R₅ or has structure:

5



m is 2 to 7; and

R₅ alkyl having 1 to about 10 carbon atoms.

23. A method for modulating the production of a
10 protein by an organism comprising contacting an organism with
a compound of claim 1.

24. A method for modulating the production of a
protein by an organism comprising contacting an organism with
a compound of claim 20.

15 25. A method for modulating the production of a
protein by an organism comprising contacting an organism with
a compound of claim 21.

26. A method for modulating the production of a
protein by an organism comprising contacting an organism with
20 a compound of claim 22.

27. A method of treating an animal having a disease
characterized by undesired production of protein comprising
contacting said animal with a compound of claim 1.

28. A method of treating an animal having a disease
25 characterized by undesired production of protein comprising
contacting said animal with a compound of claim 20.

29. A method of treating an animal having a disease
characterized by undesired production of protein comprising
contacting said animal with a compound of claim 21.

30. A method of treating an animal having a disease characterized by undesired production of protein comprising contacting said animal with a compound of claim 22.

31. A method for detecting the presence or absence of 5 an RNA in a biological sample suspected of containing said RNA comprising contacting said sample with a compound of claim 1.

32. A method for detecting the presence or absence of an RNA in a biological sample suspected of containing said 10 RNA comprising contacting said sample with a compound of claim 20.

33. A method for detecting the presence or absence of an RNA in a biological sample suspected of containing said RNA comprising contacting said sample with a compound of 15 claim 21.

34. A method for detecting the presence or absence of an RNA in a biological sample suspected of containing said RNA comprising contacting said sample with a compound of claim 22.